

FIGURE 1A

CTCGAGGACAGT GACCTGGAGTGAGTACAAGGTGAGGCCACCCTCAGGGT  
GCCAGCTCCAAGCGGGTCACAGGGACGAGGGCTGCAGGCCATCAGGAGGCCCT  
GCACACACATCTGGGACACGCGCCCCCGAGGGCCAGTTCACCTCAGTGC  
CATTCTCCTGCACAAAAGCGCCCCCATCCTTCTTCACAAGGCTTCGTGGAAG  
CAGAGGCGTCGATGCCAGTACCCCTCCCTTCCCAGGCAACGGACCCCAA  
GTTTGCTGACTGGGACCAAGCCACGCATGCGTCAAGAGTGAGAGTCCGG  
GACCTAGGCAGGGGCCCTGGGTTGGCCTGAGAGAGAAGAGAACCTCCCC  
AGCACTCGGTGTGCATCGGTAGTGAAGGAGCCTCACCTGACCCCCGCTGTTGC  
TCAATCGACTTCCAAGAACAGAGAGAAAGGAAACTTCCAGGGCGGCCGG  
GCCCTCTGGGGTTCCCACCCATTAGCTGAAAGCACTGAGGCAGAGCTC  
CCCCTACCCAGGCTCCACTGCCCGCACAGAAATAACAACCACGGTTACTGAT  
CATCTGGAGCTGTCCAGGAATT

09263242 - 092604

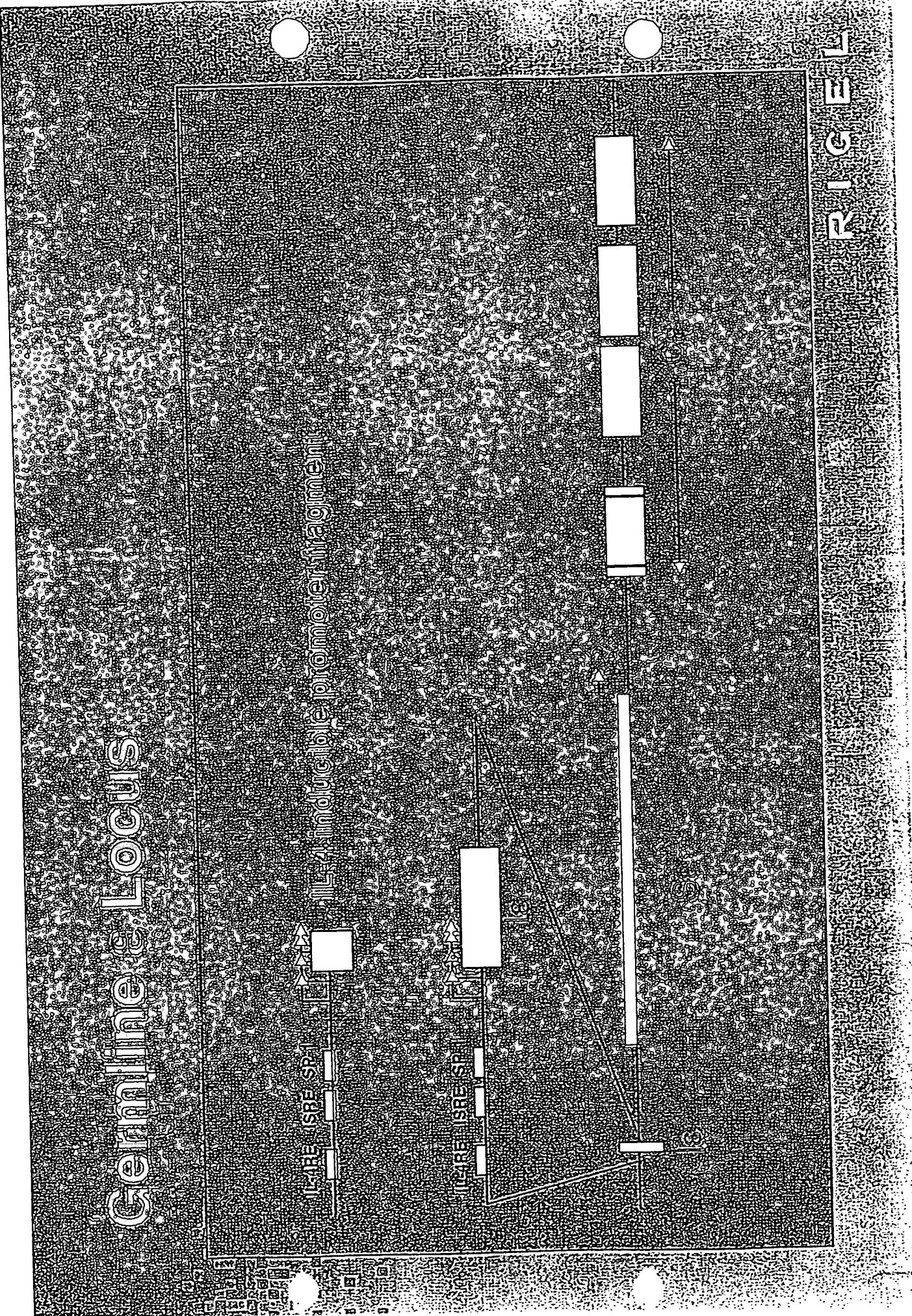
FIGURE 1B

Genuine Locus

U-4RE SRE SP1

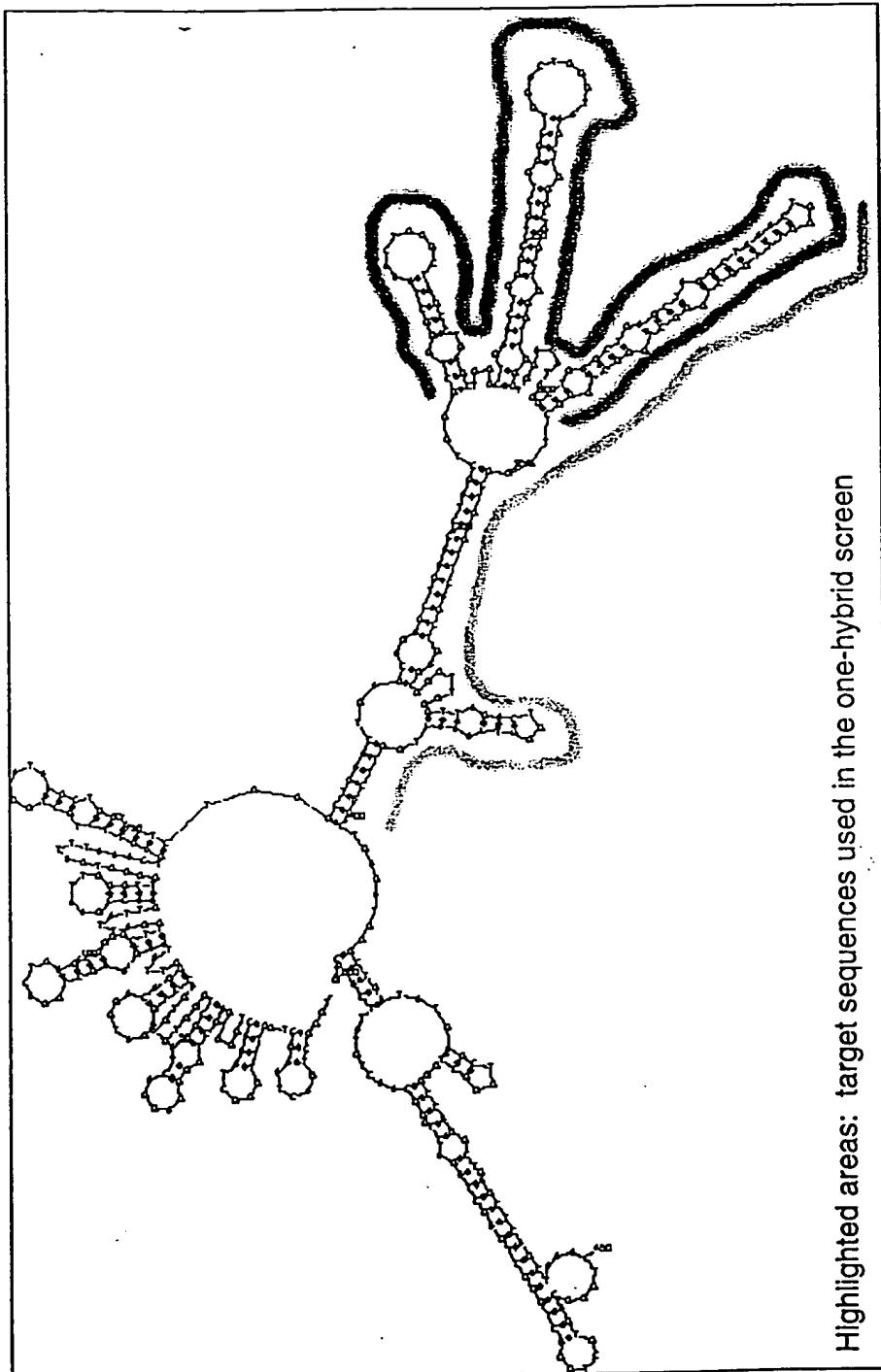
U-4RE SRE SP

RICE



## Low energy DNA folding of the S<sub>c</sub> region

FIG 2A



**FIGURE 2B**

1 GCTGGGCTAA ACTGGGCTAG CCTGAGCTGG GCTGAACCTGG GCTGCTGGGC  
51 TGGACTGGGT AAGCTGGGCT GAGCTGGGTT GGGTGGAAAT GGGCTGAGCT  
101 GAGCTAGGCT AAACCTGGGTT TGGCTGGGCT GGGCTGGGCT GGG

**FIGURE 2C**

1 GGTTTGCTG GGCTGGCTG GGCTGGCTG GGTCAGCTG AGCGGGTTGG  
51 GTTAGACTGG GTCAAACTGG TTCAGC

FIG 3

Appendix F

Yeast One-Hybrid Screening

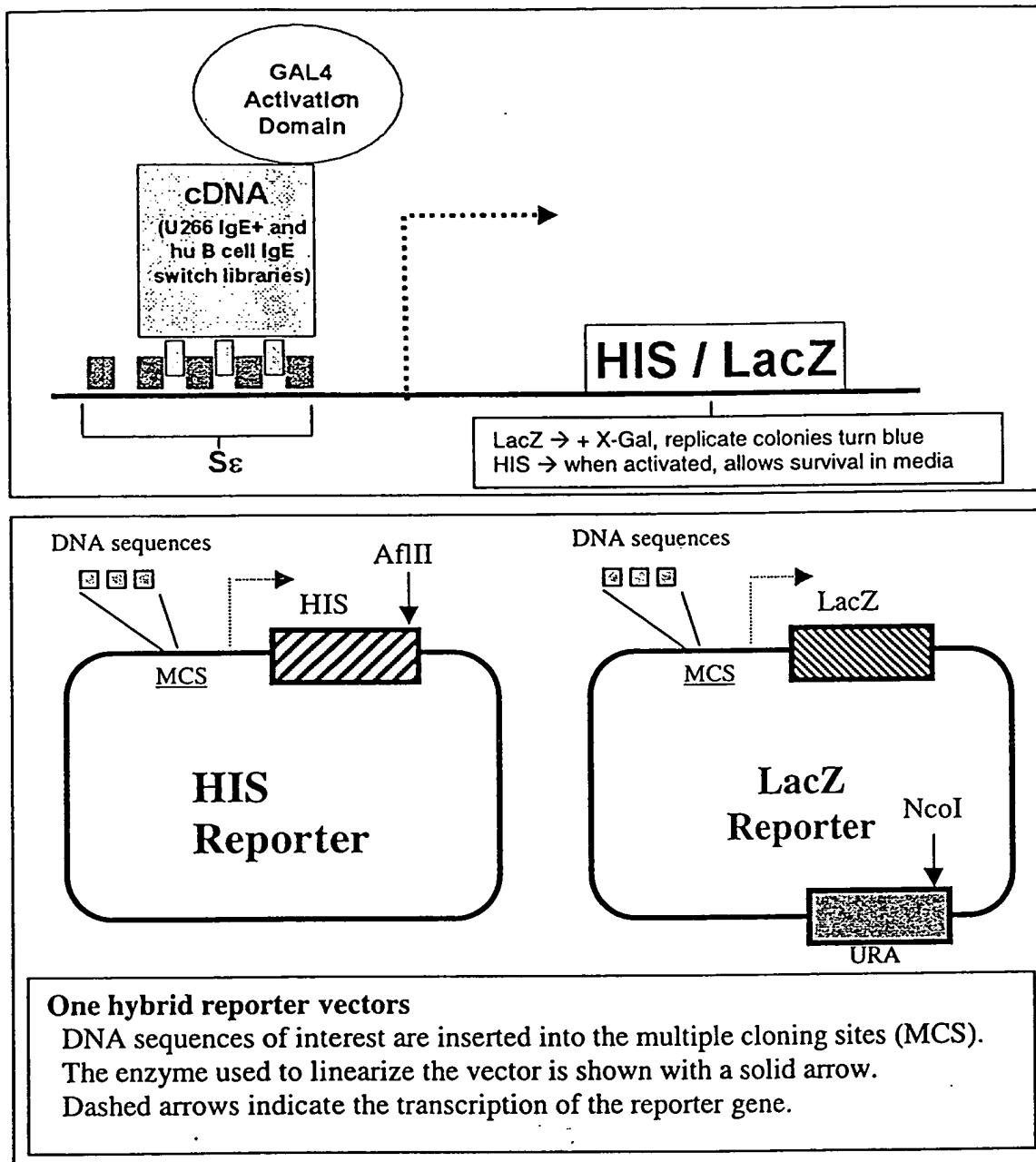


FIG 4

## IL-4 Induction of Germline $\epsilon$ mRNA in the IgM+ B cell lines: CA-46, MC-116 and DND39

Cells were incubated for 48 hrs in 300 U/ml of h-IL-4. RT-PCR was performed using primers specific for the germline  $\epsilon$  exon and the 5'-end of the  $\epsilon$  CH1 exon (predicted size ~ 200 bp).

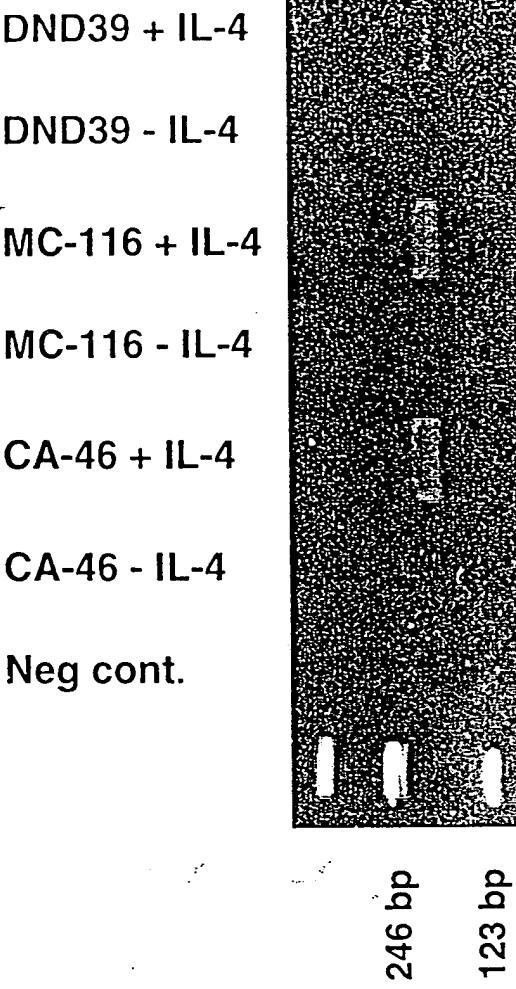
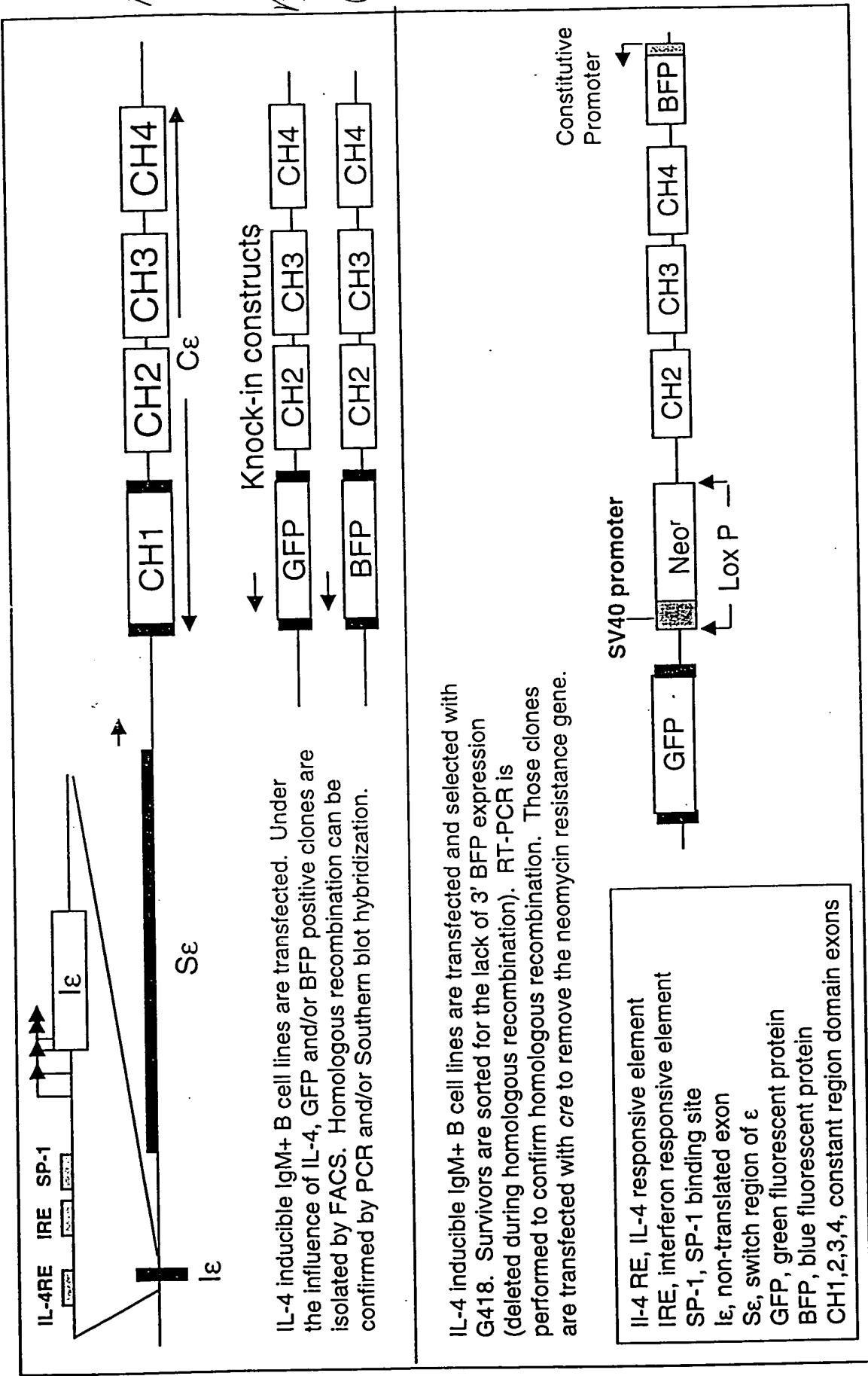


FIG 5  
T B 2 2 2 2 2 2 2 2 2

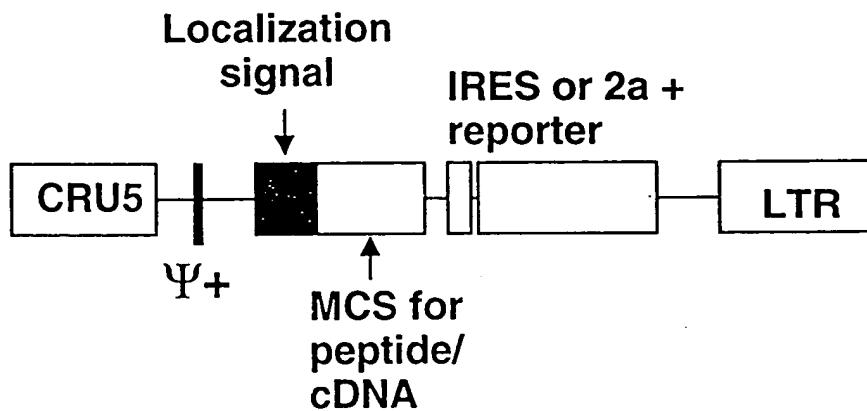
## Approaches to generate germline ε promoter knock-in reporter cell lines



## Appendix A

FIG 6

## Appendix I Rigel Base Vector



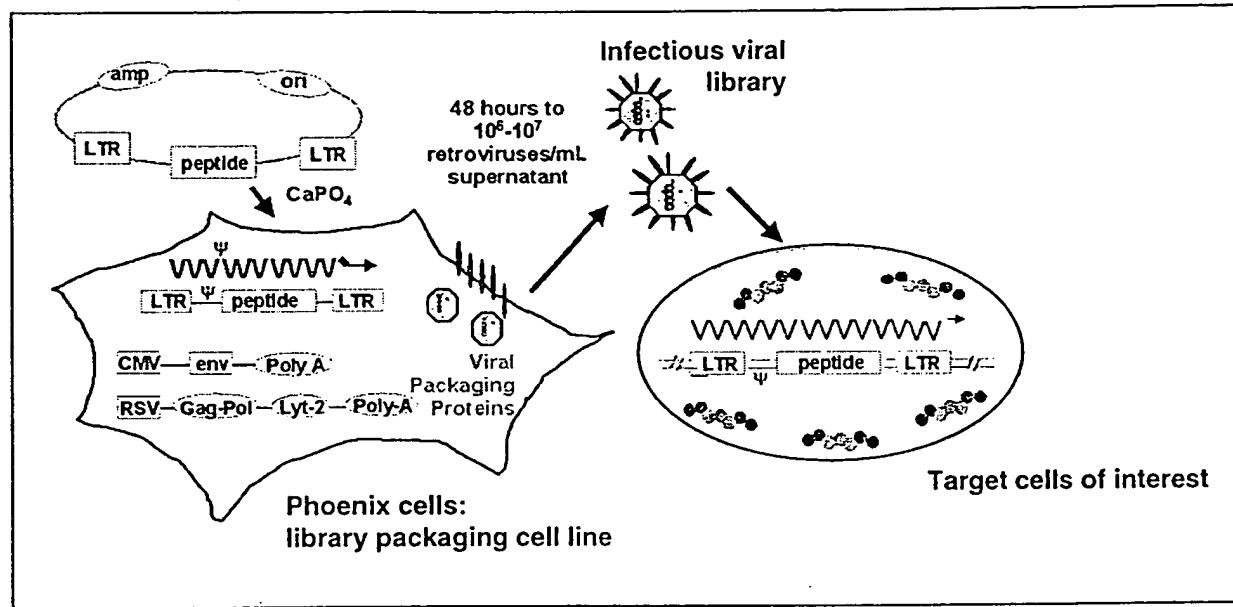
All components are cassetted for flexibility

CRU5, modified LTR  
LTR, long terminal repeat  
 $\psi+$ , packaging signal  
Localization signal: nuclear, cell membrane, granular  
MCS, multiple cloning site  
IRES, internal ribosome entry site  
2a, self-cleaving peptide

FIG 7

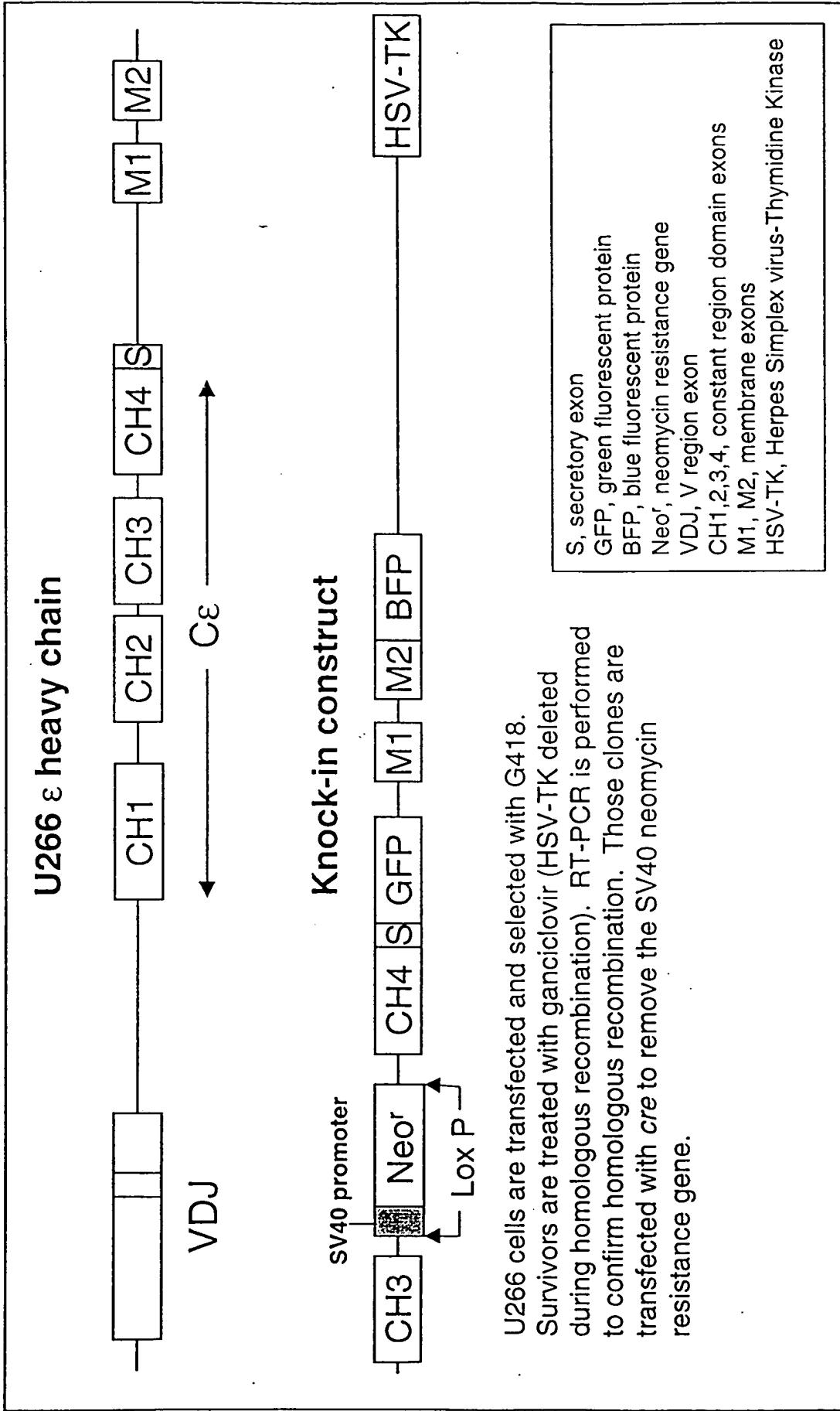
## Appendix H

### Protocol for Transfection of Phoenix Cells and Infection of Nonadherent Target Cells



8  
F(6)

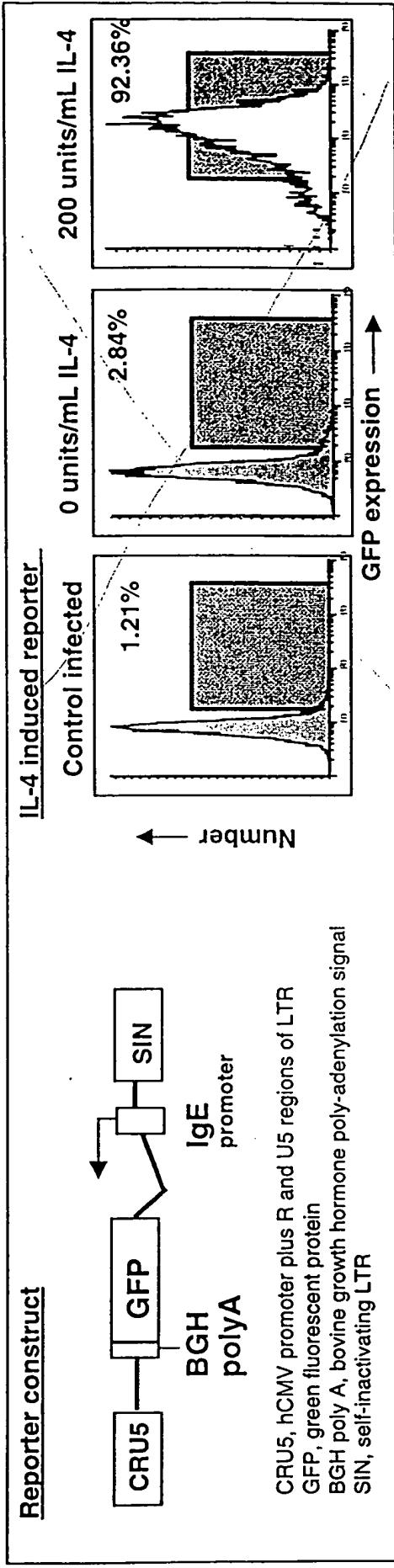
$\epsilon$  heavy chain GFP/BFP knock-in cell line



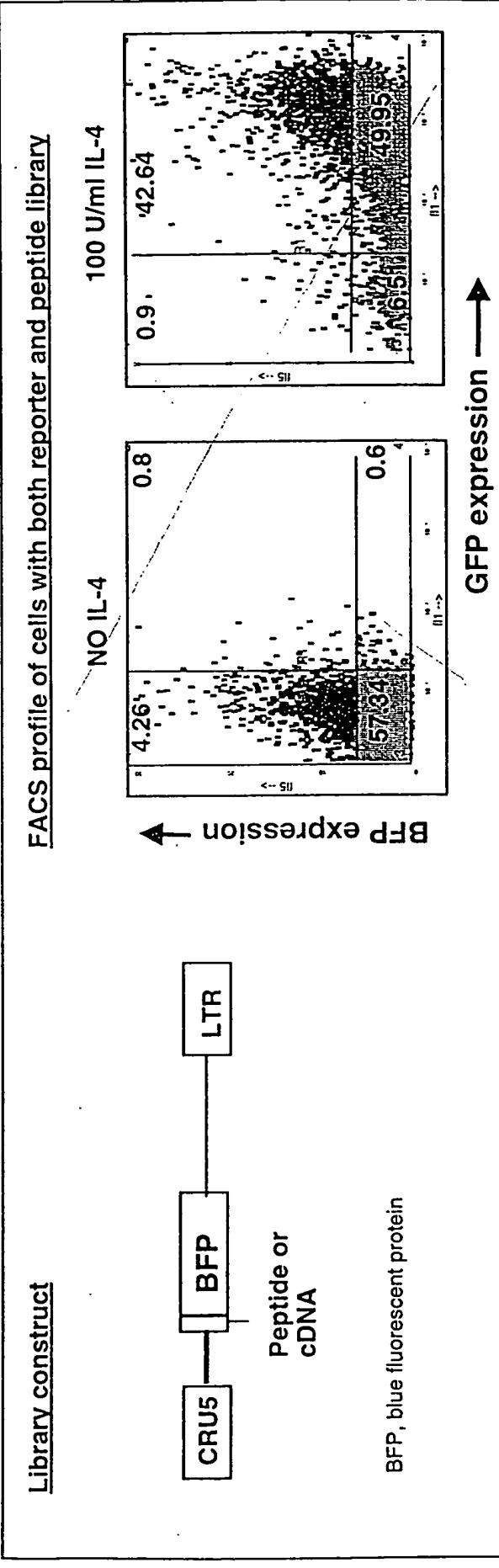
## Appendix D

## Appendix C

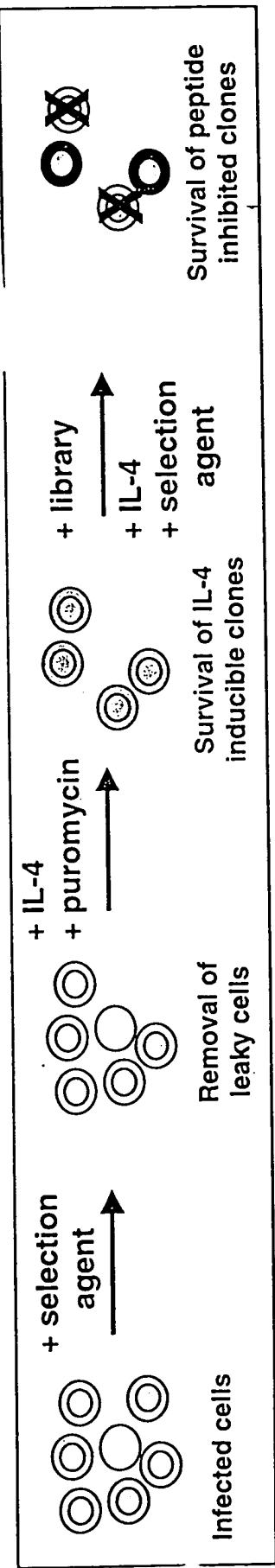
### IL-4 Inducible ε Promoter Reporter Cell Line



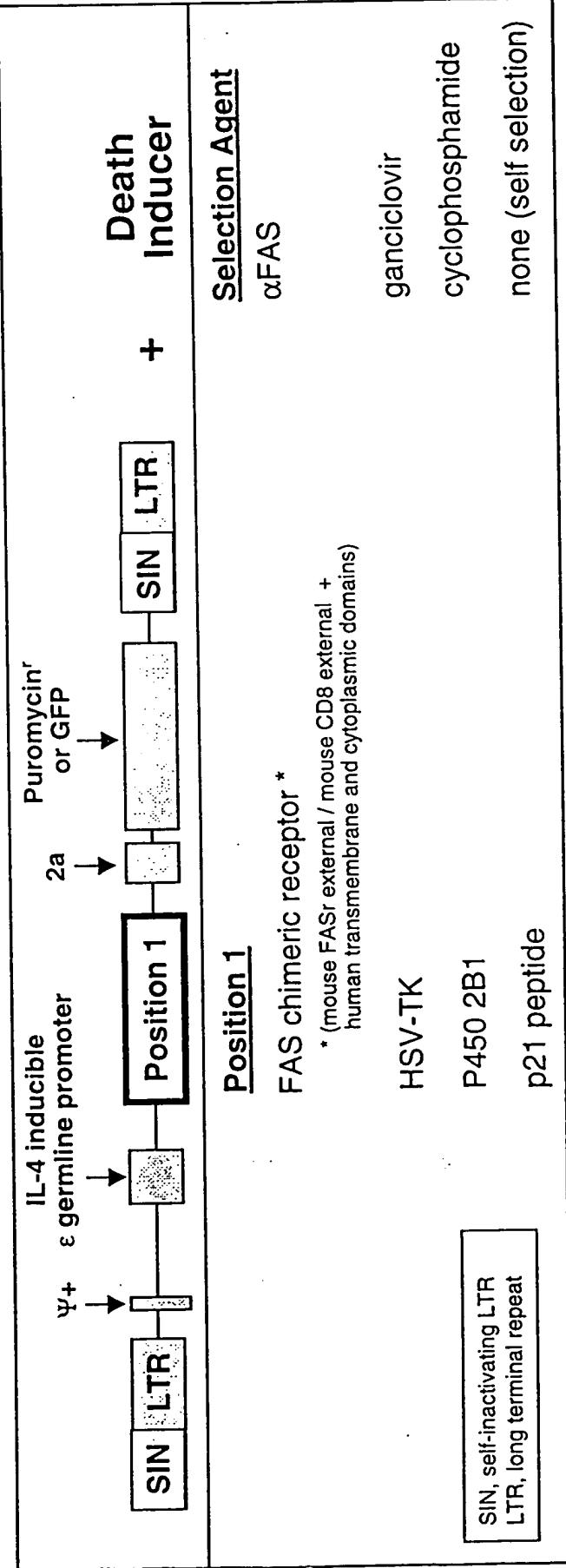
### Reporter Line Infected with BFP Construct



### Screen for Peptide Inhibitors of the Germline ε Promoter



### Survival Construct



All components are cassetted for flexibility

### Appendix D

FIGURE 11A-1

1-845 CMV promoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended ψ region  
2146-2173 two BstX1 peptide cloning sites  
2205-2723 ECMV IRES (cloned as EcoR1/Msc1 fragment from  
pCITE-4a [Novagen])  
2746-3465 GFP coding region  
3522-4115 3' LTR  
4122-6210 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTCGTCTCAAGAACAGCTTGCTTTAGGAGTTCTAAATACATCC  
CAAACCTAAATATAAAGCATTTGACTGTCTATGCCCTAGTTATTAAATAGTAATCAA  
TTACGGGTCAATTAGTCATAGCCCATAATGGAGTTCCCGCCTACATAACTACGGTAA  
ATGGCCCGCCTGGCTGACGCCAACGACCCCCGCCATTGACGTCAATAATGACGTATG  
TTCCCATAGTAACCCAATAGGGACTTCCATTGACGTCAATGGGTGGAGTATTTACGGT  
AAACTGCCACTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCTATTGACG  
TCAATGACGGTAAATGCCCGCCTGGCATTATGCCAGTACATGACCTATGGGACTTTC  
CTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTATGCCGTTGGC  
AGTACATCAATGGCGTGGATAGCGGTTGACTCACGGGATTCCAAGTCTCCACCCCA  
TTGACGTCAATGGGAGTTGTTGGCACCAAAATCAACGGGACTTCCAAAATGTCGA  
ACAACCTCCGCCATTGACGCAAATGGCGGTAGGCATGTACGGTGGGAGGTCTATATAA  
GCAGAGCTCAATAAAAGGCCACAACCCCTCACTCGGGGCCAGTCCCTCGATTGACT  
GAGTCGCCGGTACCCGTATCCAATAACCCCTTGCAGTTGCATCCGACTTGTGGT  
CTCGCTGTTCTGGGAGGGTCTCCTCTGAGTGAATTGACTACCCGTCAAGGGGGTCTT  
CATTTGGGGCTCGTCCGGATCGGGAGACCCCTGCCAGGGACCACGACCCACCG  
GGAGGTAAGCTGCCAGCAACTATCTGTTGCTGCCGATTGTCTAGTGTCTATGACTGA  
TTTATGCGCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGTATCTGGCGGACCGTGG  
TGGAACTGACGAGTTCGGAACACCCGGCGCAACCCCTGGGAGACGTCCCAGGGACTTCGG  
GGCCGTTTGTGGCCGACCTGAGTCAAAAATCCGATGTTGGACTCTTGGT  
CACCCCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAGAACCTAAAACAGTCC  
CGCCTCCGTCTGAATTGCTTCCGGTTGGGACCGAAGCCGCGCGGTCTTGTCT  
GCTGCAGCATCGTTCTGTTGCTCTGACTGTGTTCTGTATTGCTGAAAATA  
TCGGCCGGCCAGACTGTTACCAACTCCCTTAAGTTCGACCTAGGTCACTGGAAAGATG  
TCGAGCGGATCGCTACAACCAGTCGGTAGATGTCAAGAACAGACGTTGGTTACCTCT  
GCTCTGCAGAATGGCAACCTTAACGTCGGATGGCCGCGAGACGGCACCTTAACCGAG  
ACCTCATCACCCAGGTTAAGATCAAGGTCTTTCACCTGGCCCGCATGGACACCCAGACC  
AGGTCCCCTACATCGTACCTGGGAAGCCTTGGCTTTGACCCCCCTCCGGTCAAGC  
CCTTGTACACCCCTAACGCTCCGCTCCCTTCCCTCATCCGCCCGTCTCTCCCCCTTG  
AACCTCCCTCGTCGACCCCGCCCTCGATCTCCCTTATCCAGCCCTCACTCCTCTAG  
GCGCCCCCATATGCCATATGAGATCTTATATGGGGCACCCCCGCCCTGTAAACTCC  
CTGACCCCTGACATGACAAGAGTTACTAACAGCCCTCTCCAAGCTCACTTACAGGCTC  
TCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGAGCCTACCAAGAACAACTGG  
ACCGACCGGTGGTACCTCACCCCTTACCGAGTCGGCGACACAGTGTGGTCCGCCGACACC  
AGACTAACGAAACCTAGAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCA  
CCGCCCTCAAAGTAGACGGCATCGCGCTGGATACACGCCGCCACGTGAAGGCTGCCGA  
CCCCGGGGTGGACCATCCTCTAGACTGCCGGATCTGAGGGATCCACCAACCATGGACCC  
CCATTAAATTGGAATTCTGCAGCCGGGGATCCACTAGTTCTAGAGCGAATTAAATTCC

FIGURE 11A-2

GGTTATTTCCACCATATTGCCGTCTTGGCAATGTGAGGGCCCGAAACCTGGCCCTG  
TCTTCTTGACGAGCATTCTAGGGTCTTCCCCTCTGCCAAAGGAATGCAAGGTCTGT  
TGAATGTCGTGAAGGAAGCAGTCCTCTGGAAAGCTTCTGAAGACAAACACGTCTGTAG  
CGACCCCTTGCAAGGCAGCGAACCCCCCACCTGGCGACAGGTGCCTCTGCGGCAAAGC  
CACGTGTATAAGATAACACCTGCAAAGGCGGACAACCCCAGTGCCACGTTGTGAGTTGGA  
TAGTTGTGAAAAGAGTCAAATGGCTCTCTCAAGCGTATTCAACAAGGGGCTGAAGGATG  
CCCAGAAGGTACCCATTGTATGGATCTGATCTGGGCTCGGTGACATGCTTACAT  
GTGTTAGTCGAGGTTAAAAAACGTCTAGGCCCCGAACCACGGGACGTGGTTTCCT  
TTGAAAACACGATGATAATATGGGGATCCACCGTCGCCACCATGGTGAGCAAGGGCG  
AGGAGCTGTCACCGGGTGGTGCCTCGGTGAGCTGGACGGCACGTAACGGCC  
ACAAGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCCTGA  
AGTTCATCTGCACCACCGGAAGCTGCCGTGCCCTGGCCCACCCCTGTGACCAACCCCTGA  
CCTACGGCGTGCAGTCTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTCA  
AGTCGCCATGCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTCAAGGACGACGGCA  
ACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCTGGTGAACCGCATCGAGC  
TGAAGGGCATCGACTCAAGGAGGACGCAACATCCTGGGGACAAGCTGGAGTACAAC  
ACAACAGCCACAACGTCTATATCATGGCGACAAGCAGAAGAACGGCATCAAGGTGAAC  
TCAAGATCCGCCACAACATCGAGGACGGCAGCGTGCAGCTGCCGACCACTACCAGCAGA  
ACACCCCCATCGGCAGGGCCCGTGTGCTGCCGACAACCACACTACCTGAGCACCAGT  
CCGCCCTGAGCAAAGACCCAACGAGAACGCGATCACATGGTCTGCTGGAGTTCGTGA  
CCGCCGCCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTAAAGGGCCGCTCGACGA  
TAAAATAAAAGATTTATTTAGTCTCCAGAAAAAGGGGGAAATGAAAGACCCACCTGTA  
GGTTGGCAAGCTAGCTTAAGTAACGCCATTGCAAGGCATGGAAAAATACATAACTGA  
GAATAGAGAAGTTCAGATCAAGGTAGGAACAGATGGAACAGCTGAATATGGCCAAACA  
GGATATCTGTGGTAAGCAGTCCTGCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTG  
AATATGGCCAAACAGGATATCTGTGGTAAGCAGTCTGCCCGGCTCAGGGCCAAGAA  
CAGATGGTCCCCAGATCGGTCAGCCCTCAGCAGTTCTAGAGAACCATCAGATGTT  
CAGGGTCCCCAAGGACCTGAAATGACCTGTGCCATTGAACTAACCAATCAGTT  
CTTCTCGCTCTGTCGCGCTCTGCTCCCCGAGCTCAATAAAAGAGCCCACAACCC  
TCACTCGGGCGCCAGTCCTCCGATTGACTGAGTCGCCGGTACCCGTGTATCCAATAA  
ACCCCTTGCACTGCATCCGACTTGTGGTCTCGCTGTTCTGGAGGGTCTCCTCTGA  
GTGATTGACTACCCGTCAAGCGGGGTCTTCATTCCGACTTGTGGTCTCGCTGCCTGG  
GAGGGTCTCTCTGAGTGAATGACTACCCGTCAAGCGGGGTCTCACATGCAGCATGTAT  
CAAATAATTGGTTTTCTTAAGTATTACATTAAATGGCCATAGTTGCATTAAT  
GAATCGGCCAACCGCGGGGAGAGGCAGGTTGCGTATTGGCGCTTCCGCTTCCTCGCT  
CACTGACTCGCTCGCTCGGTGTTGCGCTGCCGAGCGGTATCAGCTCACTCAAAGGC  
GGTAATACGGTTATCCACAGAATCAGGGATAACGCAGGAAAGAACATGTGAGCAAAGG  
CCAGCAAAAGGCCAGGAACCGTAAAAAGGCCGTTGCTGGCTTTCCATAGGCTCCG  
CCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCGACAGG  
ACTATAAAAGATAACCAAGGCCTTCCCCCTGGAAGCTCCCTCGTGCCTCTCTGTTCCGAC  
CCTGCCGCTTACCGGATACCTGTCGCCATTCTCCCTCGGAAGCGTGGCGTTCTCA  
TAGCTCACGCTGTAGGTATCTCAGTCGGTGTAGGTCGTTGCTCCAAGCTGGCTGT  
GCACGAACCCCCCGTTCAAGCCGACCGCTGCCCTATCCGTAACTATCGTCTTGAGTC  
CAACCCGGTAAGACACGACTTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAG  
AGCGAGGTATGTAGGCGGTGCTACAGAGTTCTGAAGTGGTGGCTTAACACTACGGCTACAC  
TAGAAGGACAGTATTGGTATCTCGCCTGCTGAAGCCAGTTACCTTCGGAAAAAGAGT  
TGGTAGCTCTGATCCGCAAACAAACCACCGCTGGTAGCGGTGGTTTTGTTGCAA  
GCAGCAGATTACCGCAGAAAAAGGATCTCAAGAAGATCCTTGTATCTTCTACGGG  
GTCTGACGCTCAGTGGAACGAAAACCTACGTTAAGGGATTGGTCAATGAGATTATCAA  
AAGGATCTCACCTAGATCCTTAAATTAAATGAAGTTGCGCAAATCAATCTAAAG  
TATATATGAGTAAACTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGACACCTATCTC  
AGCGATCTGTCTATTGTTCATCCATAGTGCGCTGACTCCCCGTCGTAGATAACTAC  
GATAACGGGAGGGCTTACCATCTGGCCCCAGTGTGCAATGATAACCGCGAGACCCACGCTC  
ACCGGCTCCAGATTATCAGCAATAAACCAAGCCAGCCGGAAAGGGCGAGCGCAGAAGTGG

**FIGURE 11A-3**

TCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAAATTGTTGCCGGGAAGCTAGAGTAAG  
TAGTTGCCAGTTAATAGTTGCGCAACGTTGTCATTGCTACAGGCATCGTGGTGTC  
ACGCTCGTCGTTGGTATGGCTTCATTCAAGCTCCGGTCCCAACGATCAAGGCGAGTTAC  
ATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTCGGTCTCGATCGTTGTCAAG  
AAGTAAGTTGCCGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTAC  
TGTCAATGCCATCCGTAAGATGCTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTG  
AGAATAGTGTATGCCGGCACCGAGTTGCTCTGCCCGCGTCAACACGGGATAATACCGC  
GCCACATAGCAGAACCTTAAAAGTGTCTCATCATTGGAAAACGTTCTCGGGCGAAA  
ACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTGATGTAACCCACTCGTGCACCCAACTG  
ATCTTCAGCATCTTTACTTCAACCAGCGTTCTGGGTGAGCAAAAACAGGAAGGCAAAA  
TGCCGAAAAAGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCTTT  
TCAATATTATTGAAGCATTATCAGGGTTATTGTCTCATGAGCGGATACATATTGAATG  
TATTAGAAAAATAACAAATAGGGTTCCGCGCACATTG

FIGURE 11B-1

1-845 CMV promoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended □ region  
2151-2865 GFP coding region  
2866-2894 GGGSGGG linker  
2895-2952 FMDV 2a cleavage sequence  
2953-3004 BstX1/BstX1/HinD3/HpaI/SalI/NotI polylinker  
3052-3645 3' LTR  
3652-5715 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTCGTCTCAAGAACAGCTTGCTCTAGGAGTTCTAATACATC  
CCAAACTCAAATATAAGCATTGACTTGTCTATGCCCTAGTTAAATAGTAATC  
AATTACGGGGTCATTAGTCATAGCCCCATATGGAGTTCCCGCGTTACATAACTACGG  
TAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCATTGACGTCAATAATGACG  
TATGTTCCCAGTAGAACGCCAATAGGGACTTCCATTGACGTCAATGGGTGGAGTATTT  
ACGGTAAACTGCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCTTA  
TTGACGTCAATGACGGTAAATGGCCGCCTGGCATTATGCCAGTACATGACCTTATGG  
GAECTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTATGCG  
GTTTGGCAGTACATCAATGGCGTGGATAGCGGTTGACTCACGGGATTCCAAGTC  
TCCACCCCATGACGTCAATGGAGTTGTTGGCACCAAAATCAACGGACTTCCA  
AAATGTCGAACAACCTCCGCCCCATTGACGCAAATGGGCGGTAGGCATGTACGGTGGGA  
GGTCTATATAAGCAGAGCTCAATAAAAGAGCCCACAACCCCTCACTCGGGCGCCAGTC  
CTCCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAACCCCTCTGCAGTTGCA  
TCCGACTTGTGGTCTCGCTGTTCTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGT  
CAGCGGGGGTCTTCATTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCAGGGACC  
ACCGACCCACCACCGGGAGGTAAGCTGCCAGCAACTATCTGTCTGTCGATTGTC  
TAGTGTCTATGACTGATTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGT  
ATCTGGCGGACCCGTGGAACTGACGAGTCGGAACACCCGGCGCAACCCCTGGGAG

FIGURE 11B-2

ACGTCCCAGGGACTTCGGGGCGTTTGTGGCCGACCTGAGTCAAAATCCCGAT  
CGTTTGACTCTTGGTGCACCCCCCTAGAGGAGGGATATGTGGTCTGGTAGGAGA  
CGAGAACCTAAAACAGTCCCGCCTCGTGAATTGGCTTCGGTTGGGACCGAA  
GCCGCGCCGCGCTTGTCTGCTGCAGCATCGTCTGTGTTCTGTCTGACTGTG  
TTCTGTATTGTCTGAAAATATCGGCCGGCAGACTGTTACCACTCCCTTAAGTT  
GACCTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACACCAGTCGGTAGATGTCA  
AGAAGAGACGTTGGTTACCTCTGCTCGAGAATGGCCAACCTTAACGTCGGATGG  
CCGCGAGACGGCACCTTAACCGAGACCTCATACCCAGGTTAAGATCAAGGTCTTTC  
ACCTGGCCCGATGGACACCCAGACCAGGTCCCCATACATCGTACCTGGGAAGCCTTGG  
CTTTGACCCCCCTCCCTGGGTCAAGCCCTTGTACACCCATAGCCTCCGCCTCTT  
CCTCCATCCGCCCGTCTCTCCCCCTGAACCTCCTCGTGCACCCCGCCTCGATCCTC  
CCTTATCCAGCCCTACTCCTCTCTAGGCGCCCCATATGGCCATATGAGATCTTAT  
ATGGGGCACCCCCGCCCCCTGTAAACTTCCCTGACCTGACATGACAAGAGTTACTAAC  
AGCCCCCTCTCCAAGCTCACTACAGGCTCTACTTAGTCCAGCACGAAGTCTGGAG  
ACCTCTGGCGGCAGCCTACCAAGAACAACTGGACCGACCGGTGGTACCTCACCCCTAAC  
GAGTCGGCGACACAGTGTGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCTGG  
AAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATCGC  
AGCTTGGATACACGCCCGCCACGTGAAGGCTGCCGACCCCCGGGGTGGACCATCCTTA  
GACTGCCGGATCTCGAGGGATCCACCATGGTGAGCAAGGGCAGGGAGCTGTTACCGGG  
GTGGTGCCCATCCTGGTCGAGCTGGACGGCACGTAACGGCCACAAGTTCAGCGTGTG  
CGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCCTGAAGTTCATCTGCACCA  
CCGGCAAGCTGCCGTGCCCTGCCACCCCTCGTACCCCTGACCTACGGCGTGCAG  
TGCTTCAGCCCTACCCGACCACATGAAGCAGCACGACTTCTCAAGTCCGCATGCC  
CGAAGGCTACGTCCAGGAGCGCACCATCTTCTCAAGGACGACGGCAACTACAAGACCC  
GCGCCGAGGTGAAGTTCGAGGGCGACACCCCTGGTAACCCGATCGAGCTGAAGGGCATC  
GACTTCAAGGAGGGACGGCAACATCCTGGGGACAAGCTGGAGTACAACACTAACAGCCA  
CAACGTCTATATCATGCCGACAAGCAGAACAGGCATCAAGGTGAACCTCAAGATCC  
GCCACAACATCGAGGACGGCAGCGTGCAGCTGCCGACCAACTACCAGCAGAACACCCCC  
ATCGGCACGGCCCCGTGCTGCCGACAACCAACTACCTGAGCACCCAGTCCGCC  
GAGCAAAGACCCCAACGAGAACAGCGCATCACATGGCCTGCTGGAGTTCGTACCGCCG  
CCGGGATCACTCTGGCATGGACGAGCTGTACAAGGAATTGGAGGTGGCAGCGGTGG  
GGTCAGCTTTGAATTGGACCTTCTAAACTTGGGGAGACGTCAGTCCAACCCCTGG  
GCCCAACCACCATGGAAGCTCCATTAAATTGGTTAACGTCAGCGGCCGCTCGAC  
GATAAAATAAAAGATTATTTAGTCTCCAGAAAAGGGGGAAATGAAAGACCCACCT  
GTAGGTTGGCAAGCTAGCTTAAGTAACGCCATTGGCAAGGCATGGAAAAATACATAA  
CTGAGAATAGAGAAGTTCAAGATCAAGGTCAAGGACAGATGGAACAGCTGAATATGGGC  
AACAGGATATCTGTGTAAGCAGTCCTGCCCGGCTCAGGGCCAAGAACAGATGGAA  
CAGCTGAATATGGGCCAACAGGGATATCTGTGTAAGCAGTCCTGCCCGGCTCAGGG  
CCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTCTAGAGAACCCATCA  
GATGTTCCAGGGTGCCCCAAGGACCTGAAATGACCCCTGCTTCTGAGTCAATAAAAGAGC  
CCACAACCCCTCACTCGGGGCCAGTCCTCCGATTGACTGAGTCGCCGGGTACCCGT  
GTATCCAATAAAACCTCTTGCAAGTGCATCCGACTTGTGGTCTCGTGTCTGGAG  
GGTCTCCTCTGAGTGATTGACTACCCGTCAAGCGGGGGTCTTCAATTCCGACTTGTGGT  
CTCGCTGCCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAAGCGGGGGTCTTCA  
CATGCAGCATGTATCAAAATTAAATTGGTTTTCTTAAGTATTACATAAATGGC  
CATAGTTGCATTAATGAATCGGCCAACCGCGGGGAGAGGCAGGGTTGCGTATTGGCGCT

**FIGURE 11B-3**

CTTCGGCTTCCTCGCTACTGACTCGCTCGCTCGGTCGGCTGCCGAGCGGTA  
TCAGCTCACTCAAAGGGGTAATACGGTTATCCACAGAACGAGGAA  
GAACATGTGAGCAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAGGCCGCGTTGCTGG  
CGTTTCCATAGGCTCCGCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAG  
AGGTGGCGAAACCGACAGGACTATAAAGATACCAGGCCTTCCCGTGGAAAGCTCCCT  
CGTGCCTCTCGTGTCCGACCCCTGCCGCTTACCGGATACCTGTCCGCTTCTCCCT  
CGGGAAAGCGTGGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGAGGTC  
GTTCGCTCCAAGCTGGCTGTGCACGAACCCCCGTTCAGCCCACCGCTGCGCCTT  
ATCCGGTAACTATCGTCTGAGTCCAACCCGGTAAGACACGACTTATGCCACTGGCAG  
CAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCAGGTACAGAGTTCTTG  
AAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTGGTATCTCGCTCTGCT  
GAAGCCAGTTACCTCGGAAAAGAGTTGGTAGCTTGTACCGGAAACAAACCACCG  
CTGGTAGCGGTTGGTTGGTTGCAAGCAGCAGATTACGCGCAGAAAAAAAGGATCT  
CAAGAAGATCCTTGATCTTCTACGGGCTGACGCTCAGTGGAACGAAAACCTACG  
TTAAGGGATTGGTACGAGATTATCAAAAAGGATCTCACCTAGATCCTTAAATT  
AAAAATGAAGTTGCGCAAATCAATCTAAAGTATATGAGTAAACTTGGTCTGACAGT  
TACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTGTCATCCAT  
AGTTGCCCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCC  
CCAGTGCTGCAATGATACCGCGAGACCCACGCTACCGGCTCCAGATTATCAGCAATA  
AACCGCCAGCCGGAGGGCCGAGCGCAGAAGTGGCCTGCAACTTATCCGCCTCCAT  
CCAGTCTATTAAATTGTTGCCATTGCTACAGGCATCGTGGTCACGCTCGTGTGTTGGCT  
GCAACGTTGTTGCCATTGCTACAGGCATCGTGGTCACGCTCGTGTGTTGGCT  
TCATTAGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAA  
AAAAGGGTTAGCTCCTCGGTCTCGATGTTGTCAGAACGTAAGTTGGCCAGTGT  
TATCAGTGTGTTGACTGGGAGTACTCAACCAAGTCATTCTGAGAACGTAAGTTGGCCAGTGT  
TGCTTTCTGTGACTGGGAGTACTCAACCAAGTCATTCTGAGAACGTAAGTTGGCCAGTGT  
ACCGAGTTGCTCTGCCGGCGTCAACACGGGATAATACCGGCCACATAGCAGAACCT  
TAAAAGTGCTCATCATTGAAAAGCTCTCGGGCGAAAACCTCAAGGATCTTACCG  
CTGTTGAGATCCAGTTCGATGTAACCCACTCGTCACCCACTGATCTTCAGCATCTT  
TACTTCAACCAGCGTTCTGGGTGAGCAAAACAGGAAGGCAAAATGCCGAAAAAAGG  
GAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCCTTTCAATATTATTGA  
AGCATTATCAGGGTTATTGTCTCATGACATTAACCTATAAAAATAGGGGT

**FIGURE 11C-1**

1-845 CMV promoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended 5' region  
2146-2173 two BstX1 peptide cloning sites  
2173-2214 EcoRI/PstI/HpaI/NotI polylinker  
2262-2855 3' LTR  
2855-4901 pGEM backbone (pUC origin, ampicillin resistance)

ATCACGAGGCCCTTCGTCTCAAGAACAGCTTGTCTTAGGAGTTCTTAATACATCCAAACTCAAAT  
ATATAAAGCATTTGACTTGTCTATGCCCTAGTTATTAAAGTAATCAATTACGGGTCTTACAGTCATAG  
CCATATATGGAGTCCCGCTACATAACTTACGGTAAATGGCCCGCCTGGCTGACCGCCAAACGACCCCCG  
CCCATTGACGTCAATAATGACGTATGTCCCCTAGTAACGCCAATAGGGACTTCCATTGACGTCAATGGG  
TGGAGTATTACGGTAAACTGCCACTGGCAGTACATCAAGTGTATCATATGCCAAAGTACGGCCCTATT  
GACGTCAATGACGGTAAATGGCCCGCCTGGCATTATGCCCTAGTACATGACCTTATGGACTTCCACTTG  
GCAGTACATCTACGTATTAGTCATCGTATTACCATGGTATGCCAGTACATCAATGGCGTG  
GATAGCGGTTGACTCACGGGATTCCAAGTCTCACCCATTGACGTCAATGGAGTTGGTGGCAC  
CAAATCAACGGACTTCAAAATGTCGTAACAACCTCGCCCCATTGACGAAATGGCGGTAGGCATGT  
ACGGTGGAGGTCTATATAAGCAGAGCTCAATAAAAGAGCCACAACCCCTACTCGGGGCCAGTCCTC  
CGATTGACTGAGTCGCCGGTACCGTGTATCCAATAACCCCTTGTGAGTTGCATCCGACTTGTGGTCT  
CGCTGTCCTGGGAGGGTCTCTGTAGTGATTGACTACCCGTAGCGGGGGCTTTCATTGGGGCTC  
GTCCGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCACCGGGAGGTAAGCTGCCAGCAACTTA  
TCTGTGTCTGTCGATTGTCTAGTGTCTATGACTGATTATGCGCCTGCTCGGTACTAGTTAGCTAACT  
AGCTCTGTATCTGGCGACCGTGGAACTGACGAGTTCGGAACACCCGGCGAACCTGGAGACGT  
CCCAGGACTCGGGGCCGTTTGTGGCCGACCTGAGTCAAAATCCGATCGTTTGACTCTTG  
GTGCACCCCCCTTAGAGGAGGGATATGTGGTCTGGTAGGAGACGAGAACCTAAACAGTCCGCCCTCG  
TCTGAATTGGTCTCGGTTGGGACCGAAGCCGCCGCGCTCTGTCTGCTGAGCATCGTTCTGTG  
TTGTCTGTCTGACTGTGTTCTGTATTGTCTGAAAATCGGCCCCGGCAGACTGTTACCAACTCCCT  
TAAGTTGACCTTAGTCAGTGGAAAGATGTCGAGCGGATCGCTCACAAACAGTCGGTAGATGTCAGAACAG  
AGACGTGGGTTACCTCTGCTCTGCAAGATGGCAACCTTAACGTGGATGGCCGCGAGACGGCACCTT  
TAACCGAGACCTCATACCCAGGTTAAGATCAAGGTCTTACCTGGCCCGCATGGACACCCAGACCAGG  
TCCCTACATCGTACCTGGAAAGCCTGGCTTGACCCCCCTCCCTGGTCAAGCCCTTGTACACCC  
AAGCTCCGCCCTCTCCCATCCGCCGCTCTCCCCCTTGAAACCTCCTCGTTCGACCCGCCCTCG  
ATCCCTCCCTTATCCAGCCCTCACTCCTCTAGGCGCCCCATATGCCCATATGAGATCTTATATGGGG  
CACCCCCGCCCTGTAAACTCCCTGACCTGACATGACAAGAGTTACTAACAGCCCTCTCCAAAGCT  
CACTTACAGGCTCTACTTAGTCAGCACGAAGTCTGGAGACCTCTGGCGCAGCCTACCAAGAACAACT  
GGACCGACCGGTGGTACCTCACCCCTACAGTCAGTCTGCTGACCCACAGCAGTGTGGGTCCGCCGACACCAAGACTAAGA  
ACCTAGAACCTCGTGGAAAGGACCTTACACAGTCTGCTGACCCACCCACCGCCCTCAAAGTAGACGGC  
ATCGCAGCTGGATACACGCCACGTGAAGGCTGCCGACCCGGGGTGGACATCCTCTAGACTGCC  
GGATCTCGAGGGATCCACCAACCATGGACCCCATAAATTGAAATTGGGGCCAAAGCTTGTGTTAACGTCG  
ACGGGGCCGCCGTCGACGATAAAATAAAAGATTATTAGTCCTCAGAAAAAGGGGGATGAAAGACCC  
CACCTGTAGGTTGGCAAGCTAGCTTAAGTAACGCCATTGCAAGGCATGGAAAAATACATAACTGAGAA  
TAGAGAAGTTCAGATCAAGGTCAAGGAACAGATGGAAACAGCTGAATATGGCCAAACAGGATATCTGTGGTA  
AGCAGTTCCCTGCCCGGCTCAGGGCCAAGAACAGATGGAAACAGCTGAATATGGCCAAACAGGATATCTGT  
GGTAAGCAGTTCTGCCCGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCCGTTCCAGCCCTCAGCAGT  
TTCTAGAGAACCATCAGATGTTCCAGGGTGCCCAAGGACCTGAAATGACCTGTGCTTATTTGAACCTA  
ACCAATCAGTTCGCTCTCGCTCTGTCGCGCCTCTGCTCCCCGAGCTCAATAAAAGAGCCACAACC  
CCTCACTGGGGGCCAGTCCTCGATTGACTGAGTCGCCCCGGTACCCGTGATCCAATAAAACCTCTTG

## FIGURE 11C-2

CAGTTGCATCCGACTTGTGGTCTCGCTGTTCTGGGAGGGTCTCCTTGAGTGATTGACTACCCGTCA  
GGGGTCTTCATTCGACTTGTGGTCTCGCTGCCCTGGGAGGGTCTCCTTGAGTGATTGACTACCCGT  
CAGCGGGGTCTTCACATGCAGCATGTATCAAATAATTGGTTTTCTTAAGTATTACATTAAT  
GGCCATAGTTGCATTAATGAATCGGCCAACGCGGGGAGAGGGCGTTGCTATTGGCGCTCTCCGCTT  
CCTCGCTCACTGACTCGCTCGCTCGTCGTTCCGCTGCCGAGCGGTATCAGCTCACTCAAAGGGTA  
ATACGGTTATCCACAGAATCAGGGGATAACGCAAGGAAGAACATGTGAGCAAAGGCCAGCAAAGGCCAG  
GAACCGTAAAAGGCCGCGTTGCTGGCGTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAATC  
GACGCTCAAGTCAGAGGTGGCAGAACCCGACAGGACTATAAGATAACCAGGCGTTCCCCCTGGAAGCTCC  
CTCGTGCCTCTCTGTTCCGACCCCTGCCGTTACCGGATAACCTGTCGCCCTTCTCCCTCGGAAGCGT  
GGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTCGGTGTAGTCGTTCGCTCCAAGCTGGCTGTG  
TGCACGAACCCCCGTTCAGCCGACCGCTGCCCTATCCGTAACTATCGTCTTGAGTCCAACCCGTA  
AGACACGACTTATGCCACTGGCAGCAGCACTGGTAACAGGATTAGCAGAGCGAGGTATGAGGCGGTG  
TACAGAGTTCTGAAGTGGGCCACTACGGCTACACTAGAACAGCTATTGGTATCTCGCTCTGC  
TGAAGCCAGTTACCTCGAAAAAGAGTTGGTAGCTCTGATCCGCAAACAAACCACCGCTGGTAGCGGT  
GGTTTTTTGTTGCAAGCAGATTACGCGAGAAAAAAAGGATCTCAAGAAGATCCTTGATTTTC  
TACGGGTCTGACGCTCAGTGGAACGAAACTCACGTTAAGGGATTGGTATGAGATTATCAAAAGGA  
TCTTCACCTAGATCCTTAAATTAAAAATGAAGTTGCGCAAATCAATCTAAAGTATATGAGTAAC  
TGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGCTATTGTTCATCCAT  
AGTTGCCTGACTCCCCGTCGTAGATAACTACGGATAACGGAGGGCTTACCATCTGGCCCCAGTGTGCAA  
TGATACCGCGAGACCCACGCTCACCGGCTCCAGATTATCAGCAATAACCGAGCCAGCCGGAAGGGCCGAG  
CGCAGAAGTGGCCTGCAACTTATCCGCTCCATCCAGTCTATTAAATTGTTGCCGGAGCTAGAGTAAG  
TAGTTGCCAGTTAATAGTTGCGCAACGTTGCTACAGGCATGTTGTCACGCTCGT  
TTGGTATGGCTCATTCACTCCGGTCCCAACGATCAAGGCAGTTACATGATCCCCATGTTGCAA  
AAAGCGGTTAGCTCCTCGGCCTCCGATCGTTGTCAGAAGTAAGTGGCCGCAGTGTATCACTCATGGT  
TATGGCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTCTGTGACTGGTGAGTACT  
CAACCAAGTCATTCTGAGAAATAGTGTATGCGGCCACCGAGTTGCTCTGCCCAGGTCAACACGGGATAAT  
ACCGGCCACATAGCAGAACCTTAAAGTGTCTCATATTGAAAACGTTCTCGGGCGAAAACCTCTCAAG  
GATCTTACCGCTGTTGAGATCCAGTTGCTGATGTAACCCACTCGTCACCCAACTGATCTCAGCATCTTTA  
CTTTCACCAGCGTTCTGGGTGAGCAAAACAGGAAGGCAAAATGCCGAAAAAGGAAATAAGGGCGACA  
CGGAAATGTTGAATACTCATACTCTCCTTTCAATATTATTGAAGCATTATCAGGGTTATTGTCTCAT  
GACATTAACCTATAAAATAGGCCT

F16 12A

### (1) C12ScFas Survival construct

C12ScFas: epsilon-cFas(CD95)-Ires-Hygro-BGH PolyA put into C12s vector backwards so that no leaky transcription happens through the cmv promoter.

GAGGGCGCAGCGAACACAGTGTTCACAGGCCAGGAGAACATCGCAGTAGAAGTCTGGTTGCACTGCACTTGGTATTCTGGT  
CAGGGTGCAAGTTGTTCCACTTCTAAACCATGCTCTCATCGCAGAGTGTGCATCTCTGCATTTATCAGCATAATGGT  
TCTTGTCCATGTACTCTTCCCTCTGTGCATGGGGCACAGGTTGGGTACCCCCATTCAATTGCACTCCTCAACTTT

F1 12 B

TTTTTACCAAGGTTGGCATGGTGACAGCAAAATGGCCTCCTGATATAATCCTCTGAGCAGTTTATCAGTTCATG  
AACCCGCTCCTCAGCTTAAACTCTCGGAGATGCTATTAGTACCTTGAGTATGAACCTTAACGTGAGCCAGCAAGCA  
CCAGAGGCAGGACAGCCCAGATCCACACCAtgTGGCTTACCAACAGTACCGGAATGCCAAGCTGCGCCGCTTAAGA  
GCTGTAATTGAACCTGGGAGTGGACACCTGTGGAGAGAAAGGCAAAGTGGATGTCAGTAAGACCAATAGGTGCCTATCAG  
AACCGCAAGAGTCTCTGTCAGACAAGCCCAGTTCTATTGGTCTCCTAAACCTGCTTGTAAACCTGATACTTAC  
CTGCCCAGTGCCTCACGACCAACTTctgcaggaattcctggacagctccagatgatcagtaaccgtggtttattct  
gtgccggcagtggagccctggtaggggagctctgcctcagtgccttcagctaaaatggggggggaaaccccCaggagg  
cccgccgcgcctggaaagtccctttctctgttgcggcggcggcggcggcggcggcggcggcggcggcggcggcggcggc  
ttcaactaccatgcacccggc  
ggactctCacttgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcac  
ggacttgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcac  
ggacttgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcac  
ggacttgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcac  
ggacttgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcacgcac  
GGCTCGAcgatAAAATAAAAGATTTATTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCCACCTGTAGGTTGGCAAg  
ctagcTTAAGTAACCCATTGCAAGGCATGGAAAATACATAACTGAGAATAGAGAAGTTCAGATCAAGGTGGAACAG  
ATGGAACAGGCAATAAAAGAGCCCCACAACCCCTACTGGGGGCCAGTCCTCCGATTGACTGAGTCGCCGGTACCCG  
TGTATCCAATAACCCCTTGCAGTTGCATCCGACTTGTGGCTCGCTGTTCTGGAGGGTCTCCTGTAGTATTGA  
CTACCCGTCAGCGGGGTCTTCatgcaGCATGTATCAAAATTAAATTGGTTTTCTTAAGTATTACATTAAAT  
GGCCATagttcGTAATCATGGTCATAGCTGTTCCCTGTGAAATTGTATCCGCTCACAATTCCACACAATACGAG  
CCGGAAGCATAAAAGTGTAAAGCCTGGGTGCCTAATGAGTGAGCTAACTCACATTAAATTGCGTGCCTACTGCCGCT  
TTCCAGTCGGAAACCTGCGGCCAGCTGCATTAATGAATCGCCAACGCCGGAGAGGCCGGTTGCGTATTGGCG  
CTCTCCGCTCCTCGCTACTGACTCGCTGCCTCGCTCGCTCGCTCGCTCGCTCGCTCGCTCGCTCGCTCGCTCGCTCG  
TAATACGGTTATCCACAGAACGAGGATAACGCCAGGAAAGAACATGTGAGCAGAAAGGCCAGAAAGGCCAGGAACCGT  
AAAAAGGCCGGTTGCTGGCTTTTCATAGGCTCCGCCCCCTGACGAGCATCACAAATGACGCTCAAGTCAGAG  
GTGGCGAAACCCGACAGGACTATAAAGATACCAAGGGCTTCCCTGGAGCTCCCTCGTGCCTCGCTCGCTCGCTCG  
TGCGCTTACCGGATACCTGTCGCCCTTCTCCCTCGGAAGCGTGGCGTTCTCATAGCTCACGCTGTAGGTATCTC  
AGTTGGTGTAGGTCGTCAGCTCAAGCTGGCTGTGCAAGAACCCCCGTTAGCCGACCGCTGCGCCTATCCGG  
TAACTATCGTCTTGAGTCAACCCGTAAGACACGACTTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAG  
CGAGGTATGTAAGCGGTGCTACAGAGTTCTGAGTGGTAGCTTGTGATCCGCAAACAAACCACCGCTGGTAGCG  
TGCCTCTGCTGAAGCCAGTTACCTCGGAAAAGAGTTGGTAGCTTGTGATCCGCAAACAAACCACCGCTGGTAGCG  
TGGTTTTTTGTTGCAAGCAGCAGATTACGCCAGAAAAAGGATCTCAAGAAGATCTTGTGATTTCTACGGGGT  
CTGACGCTCAGTGGAAACAAACTCACGTTAAGGGATTGGTCATGAGATTATCAAAAGGATCTCACCTAGATCCTT  
TTAAATTAAAAATGAAGTTGCGCAAATCAATCTAAAGTATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAAT  
CAAGTGAGGCACCTATCTAGCGATCTGCTATTGCTCATCCAGTGCCTGACTCCCCGTCGTAGATAACTACGA  
TACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCAGACCCACGCTCACCGCTCCAGATTATCAGCA  
ATAAAACCAAGCCAGCCGAAGGGCCGAGCGCAGAAGTGGCTCGCAACTTTATCCGCTCCATCCAGTCTATTAAATTGTTG  
CCGGGAAGCTAGAGTAAGTAGTTGCCAGTTAATAGTTGCGAACGTTGCGCATGCTACAGGCATCGTGGTGTAC  
GCTCGTGTGTTGGTATGGCTTATTAGCTCCGGTICCAACGATCAAGGGAGTTACATGATCCCCATGTTGCAA  
AAAGCGGTTAGCTCCTCGTCCTCCGATCGTGTAGAAGTAAGTTGCCAGTGTATCACTCATGGTTATGGCAGC

# FIG 12C

ACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTCTGTGACTGGTGagtactcaaccaagtcattctgag  
aatagtgtatgcggcgaccgagggttgctttgcggcgtaaacacggataataccgcgccacatagcagaactttaaaa  
gtgctcatcattggaaaacgttcttcggggcgaaaactctcaaggatcttaccgctgttagatccagttcgatgtacc  
cactcgtgcacccaactgatttcagcatctttactttcaccagcggttctgggtgagaaaaacaggaaggcaaaatg  
ccgcaaaaaaagggaataaggcgacacggaaatgttgaataactcatactcttcctttcaatattattgaagcatttat  
cagggttattgtctcatgacattaacctataaaaaataggcgt

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FIG 13A

## (2) Ahhhh: Survival construct

2.) Ahhhh: epsilon-cFas' (CD8 or mLyt2)-Ires-Hygro-BGHpolyA also in C12s backwards

Fo- 13 B

tcaacatcgataaatttattgccactgttcaggattaagggtggagattcatgagaaccttggtttccttcgt  
ctttctgcattttctgtactcccttcacccaaacaatttagtggattggaaaagaagaagacaaggccacc  
ccaaccggttccggcccccttactgagccacggggccgacaatcttctggctctgggctgagatgtcccggtaggg  
tgcacaggtagggagtgcagcaactggcttgttagtagtagacttactttctgaaggactggcacgacagaactgaa  
gtacatcaccgagttgtgtactgagcagaaatagttagccctgtttccctgtctgaacttgtcagggtgagaacagt  
acttatttattccgtgtccctcatggcagaaaaacagttcgcacgaattcagcttctgtccacgttatcttgtgtggat  
aaaggccatatacacaacgaagggtggctggggagggtttggagctggagttggatctggaaagggccaaagagcatcttgcgaaac  
ggaccccaacacttcacatcaccagggtccaccccttcgaccaaaggcttggcgtccattttttggaaagatccggacttccg  
gtgcctgtggcttagttctccactccccaggataatcactcaccaggcagcagcaggttccgcagcagacagaaggggg  
aacggtgaggccatgtGGCTTGTACCAACAGTACCGGAATGCCAAGCTTGCGGGCGCTTAAGAGCTGTAATTGAACTTGG

GAGTGGACACCTGTGGAGAGAAAAGGCÄAAGTGGATGTCAGTAAGACCAATAGGTGCCATTAGAAACGCAAGAGTCTCT

CTGTCTCGACAAGCCCAGTTCTATTTGGTCTCCCTAAACCTGTCTTGATAACTTACCTGCCCAAGTGCCCTCACG

ACCAACTTctgcaggaaattctggacagctcccagatgatcgttaaccgtggtttatttctgtgcgggcagtggagc  
ctgggttagggggagctctgcctcagtgttcagctaaaaatggggtggaaccccCaggaggcccgggcccctggaa  
gttccctttctctgttcttggaaagtgcattgagcaacagcgggggtcagggtggcttactaccgatgcaca  
ccgagtGgggggggttctcttcgttccacCcaggccccctgccttaggtcccgacttCactttgac  
gcattgcgtggcttgggtggcccttgcattgggggttgcctggaaaaggaggggtactggcatcgac  
ccttgtccctccacgaaaggcttgcagaagaaaggatggggcgttttgcggcacttgagggtgaactg  
gcctcgggGcgcgttccagatgtgtgcaggcccctctgtatggccgcagccccctgttgcaccctgttggag  
ctggcacctgagtgggtggctcacCTTGTACTCACTCCCAGGTCACTGTCTgcacGGGGCCGCTCGACqatAAAAATAA

AAGATTTATTTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCCCACCTGTAGGTTGGCAAqctaqcTTAAGTAACCCA

TTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAGAAGTTCAGATCAAGGTCGGAACAGATGAAACAGGGCAATAAA

AAGAGCCCCACAACCCCTCACTGGGGCGCCAGTCCCTCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAAACCCCT

TCTTTCAcatgcagCATGTATCAAATTAAATTGGTTTTTCTTAAGTATTACATTAATGGCCTAgtttcgtaat

CATGGTCATAGCTTTCTGTGAAATTGTTATCGCTCACAACTTCCACACAACATAACGAGGCCGAAGCATAAAGTGT

AAAGCCTGGGTGCCTAATGAGTGA  
CTAACTCACATTAAATTGCGTGC  
GCTCACTGCCGCTTTCCAGTGG  
AAACCT

GTCTGTGCCAGCTGCATTAAATGAATCGGCCAACGCGCGGGGAGAGGCGTTTGCGTATTGGCGCTCTCCGCTTCCTCCG

TCAC TGA CTC GCT CGC TCG GT CGT TCG GCT CGG CGAG CGGT ATCA GCT CACT CAA AGGCC GT AAT ACC GT TAT CG CAC A

GAATCAGGGATAACGCAGGAAAGAACATGTGAGCAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGCCCCGCTTGT

GGCGTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAAATCGACGCCAAGTCAGACCTCCCCAACCCGACAC

GA  
CTATAAAAGATAACCAGCGTTTCCCCCTGGAAAGCTCCCTCGTCGGCTCTGCTTCCCACCGTCCCCCTTA  
CCCCNTAC

CTGTCCGCCCTTCTCCCTTCGGGAAGCGTGGCGTTCTCATAGCTACGCTGTAGCTATCTCAGTTCCCTCTACCTCT

TCGCTCCAAGCTGGGCTGTGTGCACGAACCCCCCGTTACGGCCGACCCGCTTCCCGTTATCCCGTAACTATCCGTCTTGACT

CCAACCCGTAAGACACGACTTATGCCACTGGCAGCAGCCACTGGTAACAGGATAAGCAGACCCACCTATCTACCCCCCT

GCTACAGAGTTCTTGAAGTGGTGGCTAACTACGGCTACACTAGAAGCACTTTCGCTTGCTCCGCTCTCGTACGCC

AGTTACCTTCGAAAAAAGAGTGGTAGCTCTGATCCGGAAACAAAAGCAGCCCTCTAACCCCTCCCTTGTCTTGC

AAAAACTCACGTTAACGGATTTCGGTCATGAGATTCTAAACCGTCTGAGCTAGCTGCTTAAATTNNNNNN

<http://www.ams.org/journals/proc/2007-135-09/S0002-9939-0708800-2/>

# FIG 13C

GCTTCATTCAGCTCCGGTCCAAACGATCAAGGCAGTTACATGATCCCCATGTTGTGAAAAAGCGGTTAGCTCCTT  
CGGTCCCTCCGATCGTTGTCAGAAGTAAGTTGGCCGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTTTA  
CTGTCATGCCATCCGTAAGATGCTTTCTGTGACTGGTGagtactcaaccaagtcattctgagaatagtgtatgcggcga  
ccgagttgtcttgcggcgtaaacacggataataccgcgccacatagcagaactttaaaagtgtcatcattggaaa  
acgttcttcggggcgaaaactctcaaggatcttaccgcgtttagatccagttcgatgtaaacctcgtgcacccaact  
gatcttcagcatctttactttcaccagcggttctgggtgagaaaaacaggaaggcaaatgccgaaaaaggaaata  
gggcgacacggaaatgtgaataactcataactttcaatattattgaagcatttatcagggttattgtctcat  
gacattaacctataaaaataggcgt

5' - 0 0 2 2 0 2 2 0 2